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USEFUL INVENTIONS.

An Account of the Application of Gas from Coal to economical purposes, by Mr. William Murdoch. Transac. Royal Society, 1808.

THE whole of the cotton-mill of Messrs. Philips and Lee, of Manchester, which is one of the most extensive in England, as well as its counting-houses, and store-rooms, and the adjacent dwelling house of Mr. Lee, are now lighted with gas from coal. The total quantity of light used, during the hours of burning has been ascertained by a comparison of shadows, to be about equal to the light which 2500 mould candles, of six to the pound, would give; each of the candles with which the comparison was made, consumed at the rate of 4-10ths of an ounce (175 grains) of tallow per hour.

The number of burners supplied by gas in all the buildings, are 271, of a kind fitted up on the principle of Argand's lamps, and 633 of another species, formed by a small curved tube with a conical end, having three circular apertures of about a thirtieth part of an inch in diameter, one at the point of the cone, and two lateral ones, through which the gas issues, forming three divergent jets of flame. Each of the Argand burners gives a light equal to that of four candles, of the size mentioned, and each of the common burners, a light equal to that of two and a quarter of the same candles, which altogether makes the whole light equivalent to that of the number of candles before stated. For this the 904 burners require an hourly supply of 1250 cubic feet of gas, produced from cannel coal, which is preferred to every other kind of coal for this purpose, notwithstanding its higher price, on account of the superior quality and quantity of the gas it produces.

At an average, Messrs. Philips and Lee's mill may be computed to require the gas lights two hours in every 24, all the year. The consumption of coal to produce the light for these two hours, is seven hundred weight of cannel coal, and about a third of the quantity of good common coal.

The cannel coal, costs at Manchester

22s. 6d. per ton, and the other sort about 10s. per ton.

The annual consumption of cannel coal will be 110 tons, and its cost £125, and of the other coal 40 tons, and its cost 20*l*. The 110 tons of cannel coal, after distillation, produce 70 tons of good coak, which is sold on the spot, for 1*s*. 4*d*. per cwt. and will amount annually therefore, to the sum of 493. Each ton of cannel coal produces also from 11 to 12 ale gallons of tar, which amounts in a year to 1250 gallons. But this not having been sold, its value is not stated. The quantity of aqueous liquor which came over in the distillation, could not be exactly ascertained from some springs having got into the reservoir.

The interest of the capital expended in the necessary buildings and apparatus, together with wear and tear, is stated by Mr. Lee, at about 550*l*. per annum. The whole annual expense for lighting the mill is as follows:

110 tons of cannel coal for dist.	£125
40 tons of com. coal for the fur.	20
Interest of capital, wear and tear,	550
	<u>695</u>
Deduct value of 70 tons of coak	93
	<u>£602</u>

The expense of candles to give the same light would be 2000*l*. for each candle, consuming at the rate of 4-10ths of an ounce of tallow per hour, the 2500 candles, burning two hours every 24, on an average, would at one shilling per pound (the price when this article was written) amount to nearly the sum above mentioned.

If the comparison was made on an average of three hours per day, the advantage would be still more in favour of the gas lights; for their cost, including the additional coal requisite for that time would not be more than 650*l*. whilst that of tallow rated as before would be 3000*l*. At first putting up the apparatus some inconvenience was experienced from the smell of the unconsumed, or imperfectly purified gas, but since its completion, and since the persons who take care of it, have become familiar with its management, this inconvenience has been obviated not only in the mill, but in Mr. Lee's

house which is brilliantly illuminated with it, to the exclusion of every other species of artificial light.

The peculiar softness and clearness of the gas-light, with its almost unvarying intensity, have brought it into great favour with the work people. And its being free from the inconvenience and danger resulting from the sparks, and the frequent snuffings of candles is a circumstance of material importance, as tending to diminish the hazard of fire, to which cotton mills are known to be much exposed.

The only description given of the apparatus by Mr. Murdoch, is that the coal is distilled in large iron retorts, which, during the winter season, are kept constantly at work, except during the intervals of charging, and that the gas as it rises from them is conveyed by iron pipes into large reservoirs, or gazometers, where it is washed and purified previous to its being distributed through other pipes, called mains to the mill.

These mains, branch out into a variety of ramifications, and diminish in size as the quantity of gas required to be passed through them becomes less. The burners are connected with the mains by short pipes, each of which is furnished with a cock, to regulate the admission of the gas, or shut it off entirely when requisite; every main has likewise a cock near its entrance into each room, by turning which the whole of the lights in the room may be extinguished at once.

Mr. Murdoch states that it was about sixteen years since he first made experiments on procuring light from coal gas, at Redruth in Cornwall. In 1798 he removed to Messrs. Boulton and Watt's factory at Soho, where he constructed an apparatus on a large scale, and for many successive nights lighted up the principal buildings there, by the coal gas. In 1802 a public display of the gas lights was made in illuminating Messrs. Boulton and Watt's factory, at the proclamation of peace. Since that time Mr. Murdoch has extended the apparatus at Soho, so as to give light to all the principal shops to the exclusion of other artificial light.

Mr. Murdoch concludes by stating, that although gas from Lord Dandonald's coak-ovens had been often fired before the time mentioned, and that

Dr. Clayton, so long ago as in 1759, gave an account to the Royal Society, of observations and experiments made by him, inserted in their 41st volume, which clearly manifests his knowledge of the inflammable nature of the gas, which he denominates the spirit of coals. Yet that the idea of applying it as an economical substitute for oils or tallow, does not appear to have recurred to the Doctor; and that Mr. Murdoch may fairly claim both the first idea of applying, and the first actual application of this gas, to economical purposes.

Additional notes extracted from the Athenaeum for Aug. 1808.

THIS paper of Mr. Murdoch, proves incontestibly what we had often before asserted in our former numbers, of his being the original inventor of the method of using coal gas to produce light; and of the consequent insufficiency of any patents for the invention to others. Mr. Murdoch, would have added much to the benefits he has already conferred on the public, had he given an accurate description of his apparatus for producing coal gas, particularly of the part for purifying the gas, and we have yet to hope he will do so; among other good effects, it would free the public from imagining patent rights on this head.

It is very probable that cheaper methods of making the apparatus may be devised than that used in Messrs. Philips' mill; the cost stated for it is much greater than we could have supposed.

It is to be observed, that though in situations where coal are more expensive than at Manchester, their first cost for producing coal gas, would be doubtless more; yet, that as the coak would also sell at those places for an higher price, the real cost after deductions might not be much greater.

The price of the tar should certainly have been taken into account; we have reason to think it equal, if not superior to vegetable tar for all uses, and that it is only prejudice that prevents its greater consumption. It is said to be particularly destructive to insects and worms, which would render it preicable for many purposes.

FIRE, BY ATMOSPHERIC AIR.

THE production of fire by the mere compression of atmospheric air, was a fact first discovered, about three years since, in France. This curious discovery, has lately been applied to practical utility in this country, by means of an instrument which answers all the purposes of that well known article in domestic economy, a tinder-box. It consists of a common syringe, about ten inches long, and not more than five-eighths, of internal bore. At the lower extremity it is furnished with a cap, which serves as a chamber to receive the substance to be fired, and is attached to the instrument by a screw; instead of this cap a common stop-cock may be employed. To use the instrument, the cap is unscrewed, or the stop-cock turned; a small piece of amadow or common tinder is placed in the chamber, and the cap is screwed on again. If the piston of the instrument be now depressed with as quick a motion as possible, the condensation of the air, is so active as to set the amadow on fire.

HEAT PRODUCED BY STEAM.

MR. R. BUCHANAN, of Glasgow, states the following instances, in which heat supplied by steam, has been used to advantage. Mr. R. Gillespie, finds its effects very excellent in copper plate, calico printing, and for heating calenders at his works. For this last purpose and to warm his ware-house, and counting-house, the steam is conveyed to the distance of above 93 yards.

Mr. Lounds, at Paisley, has for a considerable time used the heat of steam, with great success in dyeing fine muslins, and Messrs. Lay, Mason and Co. use it also at their bleaching works at Aberdeen.

MESSRS. BROWN, MUIR AND CO. of Glasgow, have found the heat of steam to answer much better than the usual mode by stoves. They formerly gave out their pullicats, a kind of chequered cotton handkerchiefs, to professed bleachers to be bleached, but they never had the colours of those articles in such perfection as they have had since they used the steam heat for them. Mr. Buchanan concludes with recommending steam for warming the bed-rooms of large inns,

hotels, large ware-houses and shops, churches, hospitals, and other large public buildings.

It affords us great satisfaction, to learn that steam has been already applied in London, to warm some extensive manufactories. That of Mr. Oakley, the cabinet-maker in Bond-street, in which twelve coal fires produced but an imperfect and dangerous heat, is now effectually and safely warmed by means of one small boiler of steam, which is conveyed through those extensive work-shops, and ware-rooms, by numerous pipes. It is also, so contrived that the workmen heat their glue by the same pipes. This discovery cannot fail to be attended with the most beneficial effects in all large buildings, manufactories, hotels, &c. as well as in private houses, where coals are dear, or numerous fires are burnt.

Lond. Monthly Mag.

New method of Spinning Hemp, for Ropes or Cordage, invented by John Carr, Sheffield, York.

THE object of this contrivance, for which a patent has been granted, is to regulate the degree of twist in a given length of rope yarn, by determining the rate at which the spinners walk, so as to correspond with a certain number of turns of the wheel that moves the spindles. For this purpose a small drum, about 12 inches diameter, and 20 or 24 inches long, is annexed to the axis of this wheel: on the drum a cord is coiled in the reversed direction of the motion of the wheel, so that it winds off as the wheel is turned; the end of this cord is fastened to one of the spinners, and by his receding from the wheel as fast as the cord unwinds, the object desired, of making the twist bear a certain proportion to the length of the cord is gained. The degree of this proportion will of course be regulated by the size of the drum, one of a smaller diameter will cause more twist in a given length; one of a greater diameter the reverse. All the whirls of the spindle are to be of the same size, and all the spinners employed at the wheel are to begin and end their threads at the

same time; are to keep the same speed, and to form a line with the person to whom the cord is attached.

A patent for an invention similar in its nature has been taken out by Mr. Hull, of Kingston upon Hull. In his mode, a cord goes round a drum, on the axle of the spinning wheel, as in the former plan; but instead of being attached to the spinner, it goes over a pully above the wheel, traverses to the end of the rope-walk, passes there over another pully, and is again returned to the drum, having both ends fastened together so as to form an endless band, on which band are fastened two pieces of red cloth, to serve as marks to the spinners, by which they are to regulate their pace, as it proceeds to the end of the rope-walk, always keeping in a line with it across the walk as nearly as they can.

Description of an Air Jacket and shoes, to assist Swimming; invented by Mr. William Cobb, of Swithin's-lane, London.

THE Jacket is to be made of leather or any other pliable substance

that will hold air, with pieces sewed on the back and sides, bigger than them, so as to hang loose and hollow, to form a bag for the reception of air, with which it is to be inflated by a pipe fixed to it for this purpose. The Jacket is to be buttoned before, and also to be fastened to the waist-band of the breeches with buttons. It was to have a bag annexed to it called the air receptacle, into which the air was to pass first on its way to the hollow parts of the Jacket. The swimming shoes are made of pieces of wood, of the shape of the sole of a shoe, with other pieces fastened to them by hinges and joints covered, with leather, so as to open and shut like a swan's foot in swimming.

Useful swimming belts may be made by running waste bottle corks, close together length ways on strings, 12 or 14 of which strings of length sufficient to go round the body, will form a belt of sufficient buoyancy to support a man in the water. The strings of cork would be best enclosed in a case of oil-cloth, furnished with bands for fastening it over the shoulders and between the legs.

DETACHED ANECDOTES, &c.

TROUBADOURS.

DURING the decline of chivalry, that distant adoration which had formerly been paid to the fair sex, gradually gave way to a devotion more tender and less magnificent. The women ceased to be idols of worship, and became objects of love. The times prone to corruption were not to resist their vivacity, their graces, their power to please. Love seemed to become the sole business of life.

The talents which of old recorded the deeds of valour, and the achievements of war, were now devoted to the fair. In every country of Europe, the Poet or the *Troubadour*, was to consecrate to them his homage and his songs. And to the fashions of gallantry, the rise of literature is to be ascribed. Men of genius, and men who fancied they possessed it, resorted to the courts of Princes, and to the palaces of the Nobles; and

the praise which they knew how to lavish got them attention and patronage. To make verses was the road to preferment. No lady was without her poet. Nor was poetry the exercise only, of those who wished to better their fortunes: while it was to give riches and respect to the obscure, it was to be an ornament and an honour to the great. Princes, and Barons, as well as Knights and Gentlemen, found it the surest recommendation to their mistresses: they sung their charms, their disdain, and their rigours. Even the artificial tenderness of the poet, often grew into reality; and the fair one who at first listened only to praise, was at length compelled to yield to passion. The adulation paid to beauty, disposed it to approve; complaints led to pity, pity to love.

Religion, which must ever mix in human affairs, is oftener to debase,